## *What Is Claimed Is:*

1. A method for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer greater than one, the method comprising the steps of:

(a) determining cardiac performance associated with the current set of N pacing parameters;

(b) repeating steps (c) through (e) for $i$ = one to N, where $i$ represents which of the N pacing parameter is being adjusted;

(c) incrementing an $i^{th}$ pacing parameter in the current set of N pacing parameters based on a corresponding $i^{th}$ increment value to thereby produce an $i^{th}$ set of test pacing parameters;

(d) determining a cardiac performance associated with the $i^{th}$ set of test pacing parameters;

(e) updating the $i^{th}$ increment value based on the cardiac performance associated with the $i^{th}$ set of test pacing parameters; and

(f) updating the current set of N pacing parameters based on the updated increment values determined in step (e).

2. The method of claim 1, wherein step (e) comprises the step of updating the $i^{th}$ increment value based on the difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters.

3. The method of claim 1, wherein step (e) comprises the step of updating the $i^{th}$ increment value based on:

the $i^{th}$ increment value used in step (c), and

the difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters.

4. The method of claim 3, wherein step (e) comprises the step of updating the $i^{th}$ increment value based on the equation:

$$\delta_i \leftarrow k \bullet \delta_i \bullet (P_t - P_0)$$

where,

$\delta_i$ is the $i^{th}$ increment value,

$k$ is a predetermined constant scale factor,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined in step (d),

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined in step (a), and

$\leftarrow$ denotes replacement.

5. The method of claim 1, wherein step (e) comprises the step of updating the $i^{th}$ increment value based on one of the following equations:

(1) $\delta_i \leftarrow \delta_i$ if $P_t > P_0$ , otherwise $\delta_i \leftarrow -\delta_i$ , and

(2) $\delta_i \leftarrow \delta_i$ if $P_t \geq P_0$ , otherwise $\delta_i \leftarrow -\delta_i$ ,

where,

$\delta_i$ is the $i^{th}$ increment value,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined in step (d),

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined in step (a), and

$\leftarrow$ denotes replacement.

6. The method of claim 1, further comprising the step of:(g) repeating steps (a) through (f).

7. The method of claim 1, further comprising the step of:

(g) repeating steps (a) through (f) until each of the updated increment values determined in step (e) is less than a predetermined threshold value.

8. The method of claim 1, further comprising the step of:

(g) repeating steps (a) through (f) until a difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters is less than a predetermined threshold value for all $i$ between 1 and N inclusive.

9. A method for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer greater than 1, the method comprising the steps of:

(a) determining cardiac performance associated with the current set of N pacing parameters;

(b) incrementing the $i^{th}$ pacing parameter in the current set of N pacing parameters based on an $i^{th}$ increment value, to thereby produce an $i^{th}$ set of test pacing parameters, wherein $i$ is an integer between 1 and N inclusive;

(c) determining cardiac performance associated with the $i^{th}$ set of test pacing parameters;

(d) updating the $i^{th}$ increment value;

(e) updating the current set of N pacing parameters based on the updated $i^{th}$ increment value determined in step (d); and

(f) repeating steps (a) through (e) for all N pacing parameters.

10. The method of claim 9, wherein step (d) comprises the step of updating the $i^{th}$ increment value based on the difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters.

11. The method of claim 9, wherein step (d) comprises the step of updating the $i^{th}$ increment value based on:

the $i^{th}$ increment value used in step (c), and

the difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters.

12. The method of claim 11, wherein step (d) comprises the step of updating the $i^{th}$ increment value based on the equation:

$$\delta_i \leftarrow k \bullet \delta_i \bullet (P_t - P_0)$$

where,

$\delta_i$ is the $i^{th}$ increment value,

$k$ is a predetermined constant scale factor,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined in step (d),

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined in step (a), and

$\leftarrow$ denotes replacement.

13. The method of claim 9, wherein step (d) comprises the step of updating the $i^{th}$ increment value based on one of the following equations:

(1) $\delta_i \leftarrow \delta_i$ if $P_t > P_0$, otherwise $\delta_i \leftarrow -\delta_i$, and

(2) $\delta_i \leftarrow \delta_i$ if $P_t \geq P_0$, otherwise $\delta_i \leftarrow -\delta_i$,

where,

$\delta_i$ is the $i^{th}$ increment value,

$P_i$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined in step (d),

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined in step (a), and

$\leftarrow$ denotes replacement.

14. The method of claim 9, further comprising the step of:

(g) repeating steps (a) through (f).

15. The method of claim 9, further comprising the step of:

(g) repeating steps (a) through (f) until each of the updated increment values determined in step (d) is less than a predetermined threshold value.

16. The method of claim 9, further comprising the step of:

(g) repeating steps (a) through (f) until a difference between the cardiac performance associated with the current set of N pacing parameters and the cardiac performance associated with the $i^{th}$ set of test pacing parameters is less than a predetermined threshold value for all $i$ between 1 and N inclusive.

17. A method for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer, the method comprising the steps of:

(a) determining cardiac performance associated with the current set of N pacing parameters;

(b) determining a random test set of N pacing parameters;

(c) determining cardiac performance associated with the test set of N pacing parameters; and

(d) replacing the current set of N pacing parameters with the test set of N pacing parameters if the cardiac performance associated with the test set of N pacing parameters is greater than the cardiac performance associated with the current set of N pacing parameters.

18. The method of claim 17, wherein step (b) comprises selecting N values from a plurality of predefined values, the selected N values comprising the random test set of N pacing parameters.

19. The method of claim 17, further comprising the step of:

(f) repeating steps (a) through (e).

20. The method of claim 17, further comprising the step of:

(f) repeating steps (a) through (e) until, for a predetermined number of consecutive times, the cardiac performance associated with the test set of N pacing parameters is not greater than the cardiac performance associated with the current set of N pacing parameters.

21. The method of claim 17, wherein step (b) comprises the steps of:

i. determining a set of N random increment values; and

ii. incrementing the pacing parameters in the current set of N pacing parameters using the set of N random increment values, to thereby produce the random test set of N pacing parameters.

22. The method of claim 21, wherein step (b)i. comprises selecting N values from a plurality of predefined values, the selected N values comprising the set of N random increment values.

23. The method of claim 21, further comprising the step of: (f) repeating steps (a) through (e).

24. The method of claim 21, further comprising the step of:

(f) repeating steps (a) through (e) until, for a predetermined number of consecutive times, the cardiac performance associated with the test set of N pacing parameters is not greater than the cardiac performance associated with the current set of N pacing parameters.

25. A device for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer greater than one, the device comprising:

a sensing circuit that determines cardiac performance associated the current set of N pacing parameters and cardiac performance associated with sets of test pacing parameters; and

a processor that for $i$ = one to N increments an $i^{th}$ pacing parameter in the current set of N pacing parameters based on a corresponding $i^{th}$ increment value to thereby produce an $i^{th}$ set of test pacing parameters, and

updates the $i^{th}$ increment value based on the cardiac performance associated with the $i^{th}$ set of test pacing parameters as determined by the sensing circuit,

wherein the processor updates the current set of N pacing parameters based on the updated increment values.

26. The device of claim 25, wherein the processor repeatedly updates the current set of N pacing parameters.

27. The device of claim 25, wherein the processor repeatedly updates the current set of N pacing parameters until each of the updated increment values is less than a predetermined threshold value.

28. The device of claim 25, wherein the processor employs the equation:

$$\delta_i \leftarrow k \bullet \delta_i \bullet (P_t - P_0)$$

to update $i^{th}$ increment value, where

$\delta_i$ is the $i^{th}$ increment value,

$k$ is a predetermined constant scale factor,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined by the sensing circuit,

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined by the sensing circuit, and

$\leftarrow$ denotes replacement.

29. The device of claim 25, wherein the processor employs one of the following equations to update the $i^{th}$ increment value: (1) $\delta_i \leftarrow \delta_i$ if $P_t > P_0$, otherwise $\delta_i \leftarrow -\delta_i$, and

(2) $\delta_i \leftarrow \delta_i$ if $P_t \geq P_0$, otherwise $\delta_i \leftarrow -\delta_i$,

where,

$\delta_i$ is the $i^{th}$ increment value,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined by the sensing circuit,

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined by the sensing cirucuit, and

$\leftarrow$ denotes replacement.

30. A device for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer greater than one, the device comprising:

a sensing circuit that determines cardiac performance associated the current set of N pacing parameters and cardiac performance associated with sets of test pacing parameters; and

a processor that for $i$ = one to N

increments an $i^{th}$ pacing parameter in the current set of N pacing parameters based on a corresponding $i^{th}$ increment value to thereby produce an $i^{th}$ set of test pacing parameters,

updates the $i^{th}$ increment value based on the cardiac performance associated with the $i^{th}$ set of test pacing parameters as determined by the sensing circuit, and

updates the current set of N pacing parameters based on the updated $i^{th}$ increment value.

31. The device of claim 30, wherein the processor repeatedly updates the current set of N pacing parameters.

32. The device of claim 30, wherein the processor repeatedly updates the current set of N pacing parameters until each of the updated increment values is less than a predetermined threshold value.

33. The device of claim 30, wherein the processor employs the equation:

$$\delta_i \leftarrow k \bullet \delta_i \bullet (P_t - P_0)$$

to update $i^{th}$ increment value, where

$\delta_i$ is the $i^{th}$ increment value,

$k$ is a predetermined constant scale factor,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined by the sensing circuit,

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined by the sensing circuit, and

← denotes replacement.

34. The device of claim 30, wherein the processor employs one of the following equations to update the $i^{th}$ increment value: (1) $\delta_i \leftarrow \delta_i$ if $P_t > P_0$, otherwise $\delta_i \leftarrow -\delta_i$, and

(2) $\delta_i \leftarrow \delta_i$ if $P_t \geq P_0$, otherwise $\delta_i \leftarrow -\delta_i$,

where,

$\delta_i$ is the $i^{th}$ increment value,

$P_t$ is a measure of the cardiac performance associated with $i^{th}$ set of test pacing parameters as determined by the sensing circuit,

$P_0$ is a measure of the cardiac performance associated with the current set of N pacing parameters as determined by the sensing cirucuit, and

← denotes replacement.

35. A device for improving cardiac performance associated with a current set of N pacing parameters by adjusting the N cardiac pacing parameters, where N is an integer, the device comprising: a sensing circuit that determines cardiac performance associated the current set of N pacing parameters and cardiac performance associated with random sets of test pacing parameters;

a random value generator that generates random test sets of N pacing parameters; and

a processor that replaces the current set of N pacing parameters with a random test set of N pacing parameters if the cardiac performance associated with the random test set of N pacing parameters is greater than the cardiac performance associated with the current set of N pacing parameters.

36. The device of claim 35, wherein the random value generator selects N values from a plurality of predefined values, the selected N values comprising the random test set of N pacing parameters.

37. The device of claim 35, wherein the processor repeatedly updates the current set of N pacing parameters until, a predetermined number of consecutive times, the cardiac performance associated with the test set of N pacing parameters is not greater than the cardiac performance associated with the current set of N pacing parameters.